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**Myobiid Mites of the Genus *Acanthophthirius*
(Acarina, Myobiidae) from Japan
(Part 2)**

By

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(Communicated by Kiyoshi ASANUMA)

The twenty-four species of bats representing the seven genera of the family Vesperilionidae, the main hosts of the genus *Acanthophthirius*, are known to occur in Japan. After the contribution of the previous paper dealing with the eight species (UCHIKAWA, 1979), the author has examined specimens of all the known bats for *Acanthophthirius* mites with the kind aid of Dr. Kishio MAEDA, Gifu College of Dentistry, Miss Mizuko YOSHIVUKI, National Science Museum (Nat. Hist.), Dr. Masashi HARADA, Osaka City University Medical School, and Dr. Koichi ANDO, Fukuoka University. The author's sincere thanks are due to all of the above leading chiropterologists in Japan.

The type specimens of *Murina tenebrosa* YOSHIVUKI and *Myotis ozeensis* IMAIZUMI, which are known only from these types, and *Myotis ikonnikovi* OGNEV were free from *Acanthophthirius* mite, but all the other species of bats yielded some mites of the genus. These mites comprise 13 species and subspecies, inclusive of 3 anonymous ones known only from either sex. Thus, a total number of *Acanthophthirius* taxa from Japan comes to 21 including the 8 in the previous paper (UCHIKAWA, 1979).

Dr. MAEDA, an active chiropterologist, suggests personally that the bat fauna of Japan has not thoroughly been clarified yet and that some more distinctive species will probably be added to it. In this case, some different *Acanthophthirius* mites may come out, but already gotten 21 species and subspecies bring forth much informations suggestive of systematic relations among host bats, which deserve to be taken into account by chiropterologists as well as acarologists.

The present paper deals with the description of 12 nominate or anonymous species, and with the discussion on systematics of host bats in the light of the similarity and difference of mites.

9. *Acanthophthirius* (*Acanthophthirius*) *noctulius* (RADFORD, 1938)

(Figs. 1 and 19-1)

The male specimens from Japan show a clear deviation only in the length and nature of the intercoxal setae, *ic₄*, as compared with those from Europe. The setae *ic₄* are stout and distinctly barbed and much shorter on the Japanese specimens,

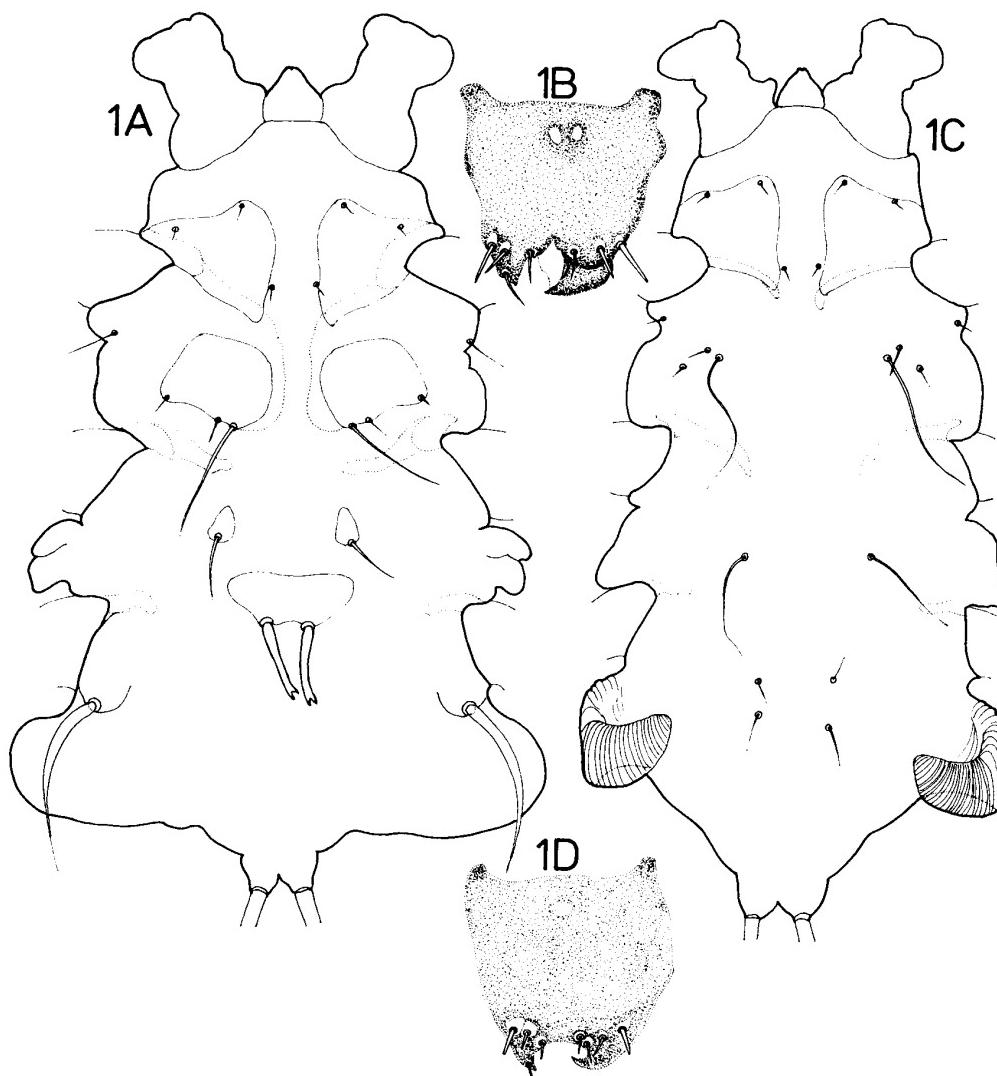


Fig. 1. *Acanthophthirius (Acanthophthirius) noctulius* (RADFORD, 1938), male (A, B) and *Acanthophthirius (Acanthophthirius) plecotius* (RADFORD, 1938), male (C, D). — A, C venter; B, D, genital shield.

ranging from 53 to 63 μm long, than on European specimens. The position of a barb on the seta is displaced from mid-point on European specimens to a distal third to fifth on Japanese specimens. The above difference detectable only in the male is ascribed to an intraspecific variation as in the case of *Acanthophthirius (Acanthophthirius) plecotius* (RADFORD) (UCHIKAWA, 1979) (Figs. 1 C and D).

Material examined. Nine ♂♂, 13 ♀♀, ex *Nyctalus lasiopterus*, Sapporo, Hokkaido, Japan, 22 April 1967 (coll. Dr. MAEDA); 1 larva from the same host, Aomori Pref., date uncertain.

10. *Acanthophthirius (Acanthophthirius) yoshiyukiae* sp. nov.

(Figs. 2, 3 and 19-2)

Male (Fig. 2). Lateral cuticular expansion between legs III and IV and posterior to legs IV weak. Inflation of legs II also weak. Genital shield essentially the same as that of the preceding species but small in size. Penis stout and almost straight. Two pairs of intercoxal setae, ic_2 and ic_4 , long and setiform. Setae $cxIV$ apart considerably from ic_4 , fine and setiform.

Measurements in microns (holotype and 2 paratypes): Body (=gnathosoma + idiosoma) 370 (350–370) long by 220 (200–230) wide at level between legs III and IV; ve 90 (93–?) long; $sc\ i$ 70 (75–75); $sc\ e$ 140 (135–148); d_1 48 (48–55); d_2 98 (98–98); l_1 140 (145–163); 3 pairs of caudal setae 20–25; ic_2 50 (52–?); ic_4 45 (50–35); $cx\ IV$ about 35; ic_3 – ic_3 75 (75–105); ic_4 – $cx\ IV$ 28 (23–30); penis 100 (100–105).

Female (Fig. 3). Only strongly damaged 2 specimens were available. Body 495–560 μm long by 225–235 μm wide. All the morphological accounts show that the female of the present new species is hardly separable from that of *A.(A.) noctulius* (RADFORD).

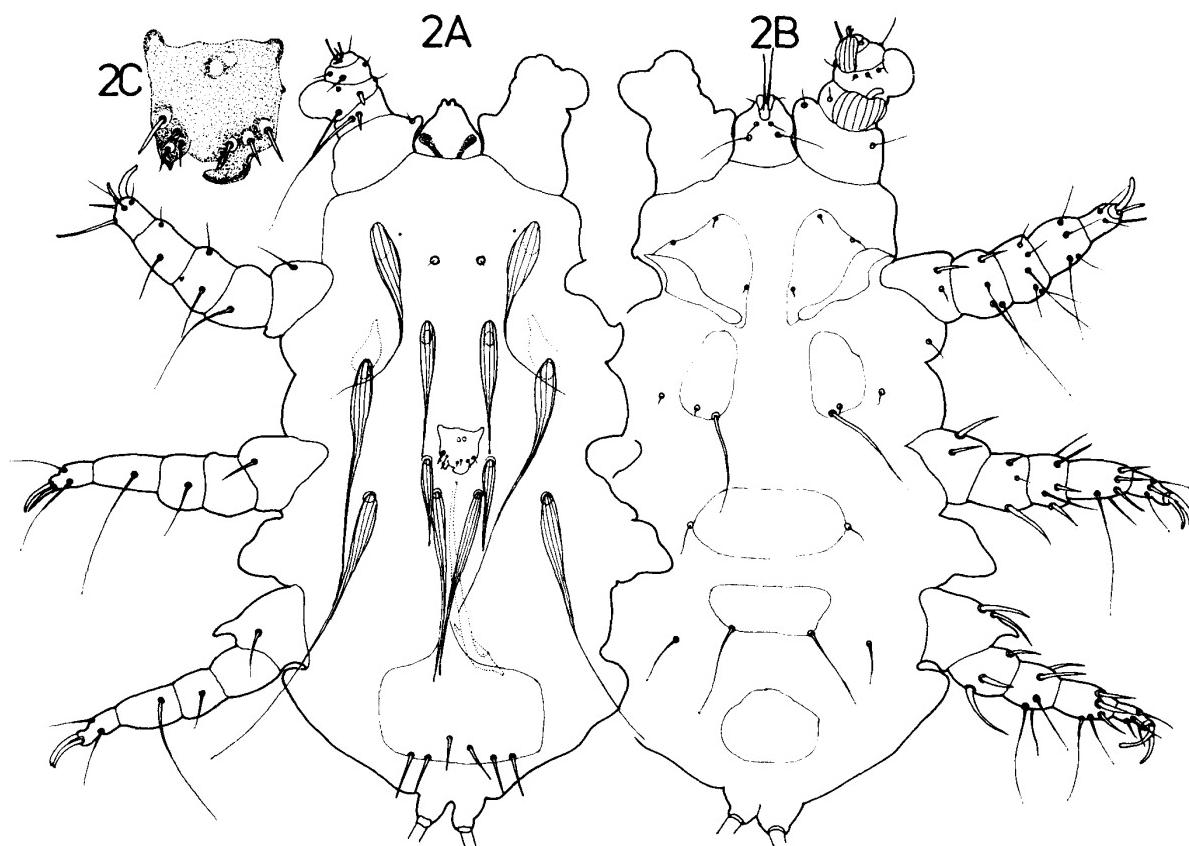


Fig. 2. *Acanthophthirius (Acanthophthirius) yoshiyukiae* sp. nov., male.—A, dorsum; B, venter; C, genital shield.



Fig. 3. *Acanthophthirius (Acanthophthirius) yoshiyukiae* sp. nov., female.—A, dorsum; B, venter.

Material examined. Holotype male and a nymph, ex *Nyctalus furvus*, Miyako City, Iwate Pref., 19 August 1978 (coll. Dr. HARADA); a paratype male, 1 ♀, 2 nymphs from the same host, Iwaizumi Town, Iwate Pref., 31 August 1961; a paratype male, 1 ♀ and 1 nymph from the same host, 29–31 August 1960; 1 nymph from the same host and locality, 25 September 1961.

The holotype is deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo (NSMT-Ac 9339), and the other specimens in the collection of the author.

Notes. *Acanthophthirius (Acanthophthirius) yoshiyukiae* sp. nov., which is characterized mainly by the male morphology, is distinctive in having unique outline of the idiosoma, long and setiform intercoxal setae, ic_2 and ic_4 , and $cx\text{ IV}$ moderately apart from ic_4 .

The mite was named after Miss M. YOSHIVUKI, one of the nominators of the host bat, who extended unfathomable help throughout the present study.

11. *Acanthophthirius (Chiromyobia) luzonensis endoi* subsp. nov.

(Figs. 4 and 19-4)

Male (Fig. 4). Setal arrangement and nature as in Fig. 4. Dorsal setae d_1 terminating in blunt tips and slightly thicker than d_2 . Three pairs of coxal setae II on holotype and a pair of extra setae close to $cx\ II_3$ on paratype. Femur I inflated posteriorly. Leg II inflated strongly. Distal smaller spine on tibia III abruptly diminished and pointed. Genital shield asymmetrical, one posterior lobe vestigial, with 4 pairs of minute setae, one pair of which are strong (Fig. 4 C). Unannulated areas on dorsum and venter not clearly seen.

Measurements in microns (holotype and paratype): Body 570–540 long by 270–245 wide; ve 180–160 long; $sc\ i$ 130–115; $sc\ e$ 220–198; d_1 83–78; d_2 220–185; ic_4 68–68; thickness of femur II 83–70; maximum thickness of leg III 75–65; distal spine on tibia III 47–38 long. Penis 143–145.

Female. Only a single specimen was available.

Measurements in microns (allotype): Body 600 long by 300 wide; ve 133 long,

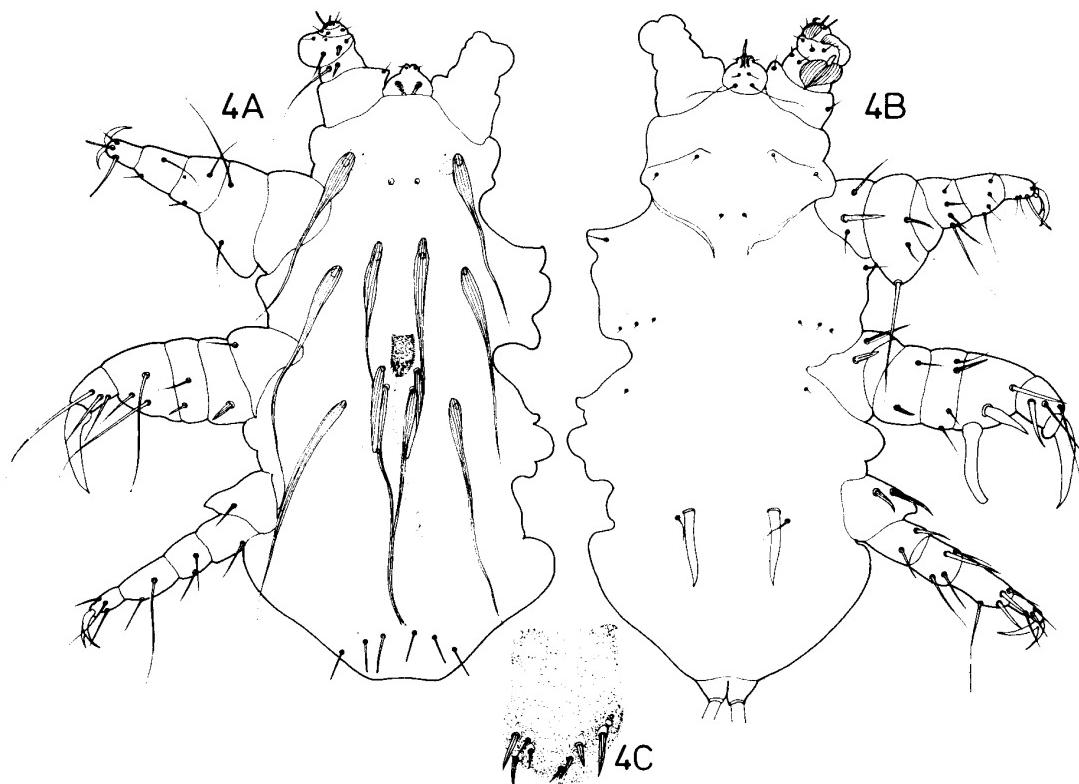


Fig. 4. *Acanthophthirius (Chiromyobia) luzonensis endoi* subsp. nov., male.—A, dorsum; B, venter; C, genital shield.

22 wide; vi 85; $sc\ e$ 170; $sc\ i$ 133; d_1 78; d_2 80; d_3 70; d_4 48; d_5 45; l_1 220; l_3 70; l_4 34; ic_2 83; ic_3 111; ic_4 70.

Material examined. Holotype male, allotype female, a paratype male and a deutonymph ex *Pipistrellus endoi*, Omoe, Miyako City, Iwate Pref., Japan, 9 August 1978 (coll. Dr. M. HARADA).

The holotype is deposited in the collection of the National Science Museum, Tokyo (Nat. Hist.) (NSMT-Ac 9340), and the other types and a deutonymph in the collection of the author.

Notes. Although the female bears almost no specific characteristics, the male of the present new subspecies is distinct in having the inflated femur I and legs III, d_1 thicker than d_2 and rather long distal spines on tibia III. The corresponding measurements for the males of the closely related form, *Acanthophthirius (Chiromyobia) luzonensis septentrionalis* UCHIKAWA, are as follows: Thickness of femur II 43–48 μm ; maximum thickness of leg III 48–55 μm ; and length of the distal spine on tibia III 25–28 μm . The setae d_1 are slenderer than d_2 on the male of *A.(C.) luzonensis septentrionalis* UCHIKAWA. The male genital shield is also specific and suggests that the mite differs from the other forms beyond the subspecies level, though the female is alike to those of other species.

12. *Acanthophthirius* sp. 1

Material examined. One female and 2 deutonymphs ex *Pipistrellus savaii velox*, Takizawa, Aomori Pref., Japan, 31 August 1974; 1 female and 2 deutonymphs ex *Pipistrellus savaii coreensis*, Tsushima, Nagasaki Pref., Japan, in September, 1964.

Notes. The female and deutonymph taken from the two subspecies of *P. savaii* were conspecific. The female is separable from those of *A.(C.) luzonensis septentrionalis* UCHIKAWA and the above new subspecies by the nature of setae d_5 and l_4 and internal anal setae, ai . The former two setae are fine and rather long and ai are distinctly inflated and blade-form only in the present anonymous species. The deutonymph of the mite differs remarkably from that of the above new subspecies in having much longer hysterosomal setae on the dorsum.

Although males are not yet known, the present anonymous species is thought to belong to the subgenus *Chiromyobia* FAIN and to represent a distinct taxon.

13. *Acanthophthirius (Myotimyobia) pantopus* (POPPE et TROUESSART, 1895)

(Figs. 5, 6 and 19-7)

Male (Fig. 5). Setae ve and $sc\ e$ inflated and striated basally and with fine tails. $Sc\ i$ terminating in blunt tips. Dorsal setae d_1 and d_2 rather short and stout. Lateral setae l_1 long. Ventral setae ic_2 very long, extending beyond basal level of ic_4 . Setae ic_3 situated laterally and long. Genital shield as in Fig. 5 C, with 4 pairs of minute setae. Penis stout. Trochanter I with prominent projection on antero-lateral margin. Legs II–IV thickset.

Acanthophthirius Mites from Japan (Part 2)

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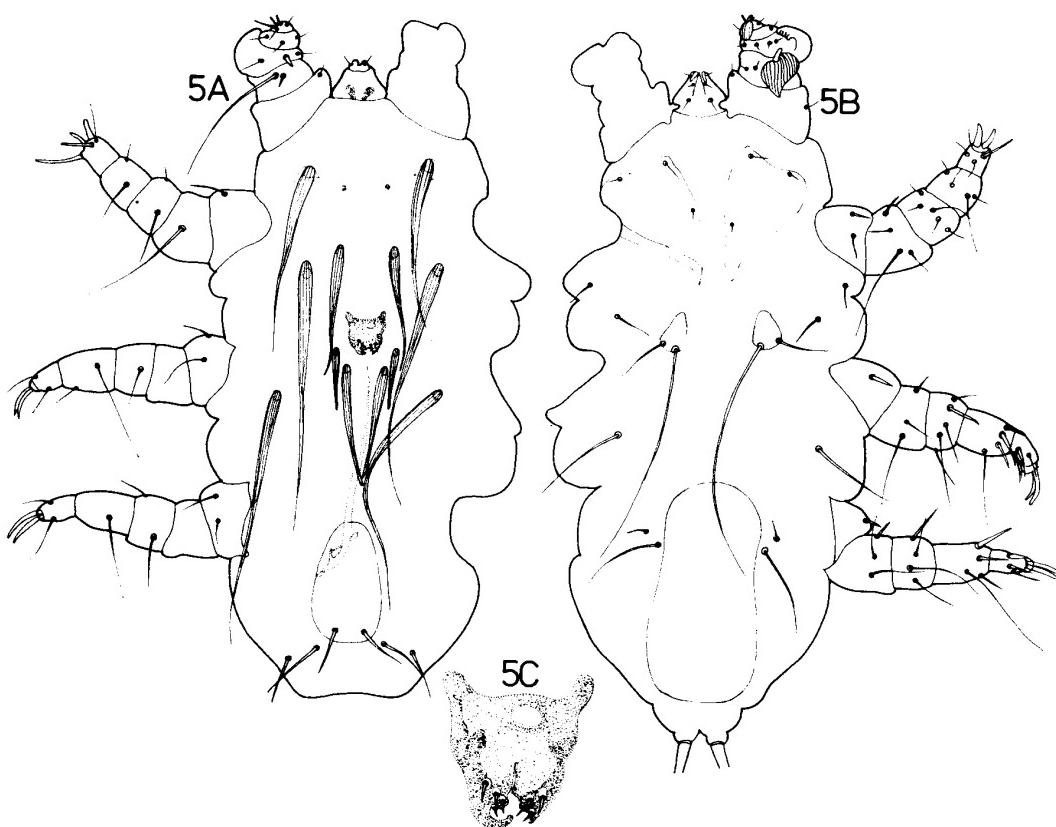


Fig. 5. *Acanthophthirius (Myotimyobia) pantopus* (POPPE et TROUESSART, 1895), male. ——A, dorsum; B, venter; C, genital shield.

Setae *ve* and *sc i* asymmetrical on either of 2 specimens.

Measurements in microns (3 specimens): Body 390–500 long by 175–215 wide; *ve* 105–104 long; *sc e* 148–210; *sc i* 60–83; *d*₁ 35–40; *d*₂ 68–73; *l*₁ 165–190; 3 pairs of terminal setae subequal, about 30–45 long; *ic*₂ 135–150; *ic*₃ 63–70; *ic*₄ 45–50; penis 125–140 long.

Female (Fig. 6). Propodosomal setae dilated and hysterosomal setae rather slender. Ventral setae *ic*₂–*ic*₄ prominent and losing length in this order.

Measurements in microns (2 specimens): Body 550–570 long by 250–265 wide; *ve* 105–113; *vi* 65–70; *sc e* 170–163; *sc i* 93–95; *d*₁ 80–85; *d*₂ 95–90; *d*₃ 78–90; *d*₄ 60–65; *d*₅ 55–55; *l*₁ 200–200; *l*₂ 85–88; *l*₄ 48–53; *ic*₂ 130–145; *ic*₃ 85–100; *ic*₄ 80–75.

Material examined. One male ex *Barbastella leucomelas*, Akasaka Pass, Kamishi City, Japan, 23 July 1976; 1 male, 2 females and a deutonymph from the same host, Tamayama Town, Iwate Pref., 24 August 1975 (coll. Dr. ANDO); a male from the same host and locality, 10 September 1978 (coll. Dr. HARADA).

Notes. Characteristics of this species are presented clearly in FAIN and AELLEN (1979), and some what differently in RADFORD (1952). The remarkable specific properties are found in the male. Although only the 3 specimens were examined in the

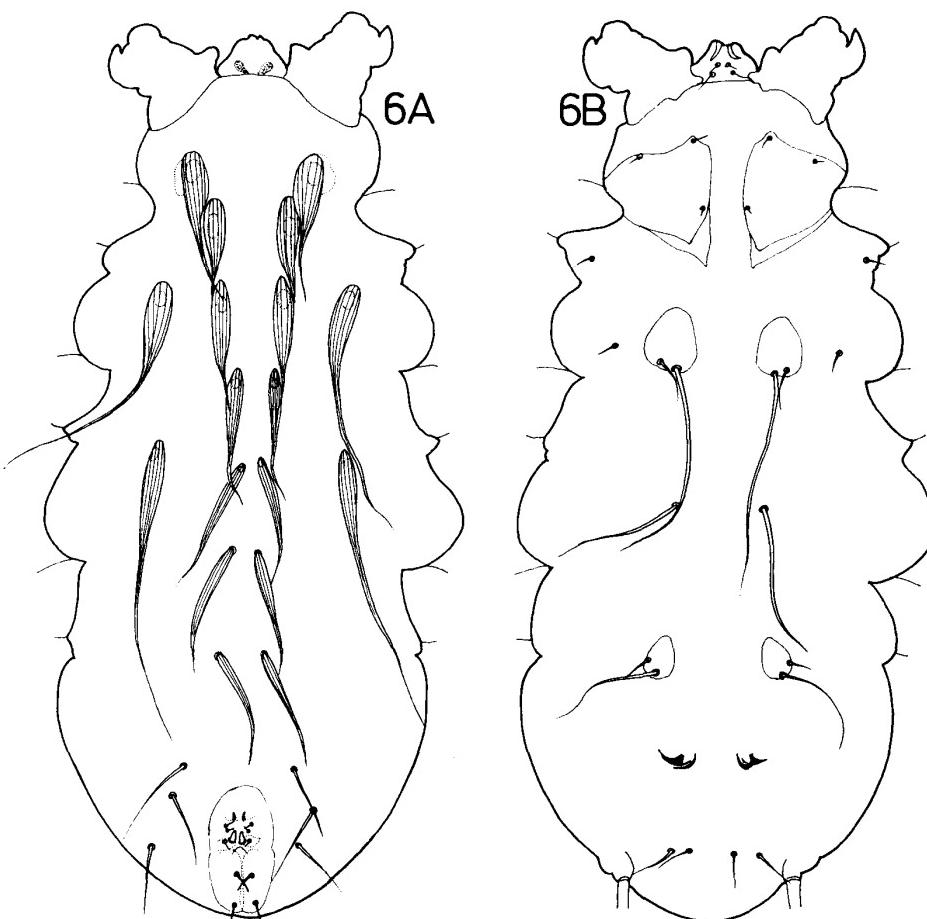


Fig. 6. *Acanthophthirius (Myotimyobia) pantopus* (POPPE et TROUESSART, 1895), female. —
A, dorsum; B, venter.

present study, some dorsal setae were found to be strongly variable bilaterally.

FAIN (1978) suggested the occurrence of the synhospitaly of *Acanthophthirius (Myotimyobia)* on *Barbastella barbastellus* and presented the second species, *A.(M.) hanensis* FAIN from Belgium. The more prevalent species, *A.(M.) pantopus* (POPPE et TROUESSART), has so far been recorded from France (type locality), England (RADFORD, 1952), Czechoslovakia (DUSBÁBEK, 1963), Belgium (FAIN, 1976 b) and Switzerland (FAIN & AELLEN, 1979). The present record of the mite from the outside far apart from Europe and from a different species of *Barbastella* suggests the close affinity of *B. barbastellus* distributed in Europe and *B. leucomelas* in Japan.

14. *Acanthophthirius (Myotimyobia) helveticus* FAIN et AELLEN, 1979

(Figs. 7 and 19-8)

The 3 male and 2 female specimens taken from *Eptesicus nilssoni parvus* well accorded with the original description of *A.(M.) helveticus* FAIN et AELLEN, 1979. The most important characteristics of this species are found in the genital shield and situa-

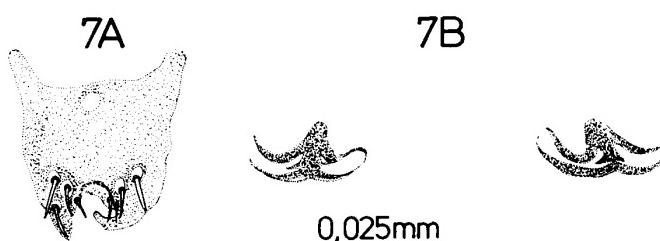


Fig. 7. *Acanthophthirius (Myotimyobia) helveticus* FAIN et AELLEN, 1979. — A, male genital shield; B, female opisthogastric sclerites.

tion of the ventral setae ic_3 in the male. The structure of the genital shield is presented in Fig. 7 A. The distance between setae ic_3 was 80–95 μm , and the idiosomal width at the level of the setae ic_3 was 165–213 μm in the 3 specimens. Thus, the setae were situated slightly closer to the median line than to the lateral margins on all the specimens.

Some specimens from *Eptesicus japonensis* could not be separable from *A.(M.) helveticus* FAIN et AELLEN, though the male genitalia were not clearly observed. And the mites were tentatively relegated to the same taxon.

Material examined. Two ♂♂ ex *Eptesicus nilssoni parvus*, Koshimizu Town, Shari-gun, Hokkaido, Japan, 4 August 1974; 3 nymphs from the same host and locality, 14 August 1974; 1 ♂ from the same host, Oketo, Hokkaido, 27 July 1972; 1 ♀ and 1 nymph from the same host, Hidaka Petegari-dake, Hokkaido, 30 July 1970; 1 ♀ and 1 nymph from the same host, Hiratori Town, Hidaka, Hokkaido, 26 August 1971 (coll. Dr. MAEDA).

Two ♂♂ and 1 nymph ex *Eptesicus japonensis* (the type specimen), Hokujo, Kitaazumi-gun, Nagano Pref., Japan, 15 July 1951; 1 ♀ and 1 nymph from the same host, Tokiwa, Kitaazumi-gun, Nagano Pref., 30 July 1953 (coll. the late Mr. HOSONO); 1 ♀ from the same host, Mr. Fuji, Yamanashi Pref., 19 July 1965; 1 ♀ from the same host and locality, 6 July 1973 (coll. Miss YOSHIVUKI).

15. *Acanthophthirius (Myotimyobia) mystacinoides* sp. nov.

(Figs. 8, 9 and 19-15)

Male (Fig. 8). Setae $sc\ i$ situated slightly anteriad from $sc\ e$. Setae d_1 almost on basal level of l_1 , but originating from different levels bilaterally. Genital shield asymmetrical; one of caudal lobes strong and recurved interiorad; 4 pairs of minute genital setae, one of which is inflated. Penis straight and long. Three pairs of ventral setae, ic_2 – ic_4 , long. Unannulated areas and legs as in Fig. 8.

Measurements in microns (holotype and 4 paratypes): Body 430 (415–450) long by 165 (160–190) wide; ve 120 (100–110) long; $sc\ i$ 75 (73–83); $sc\ e$ 165 (133–150); d_1 47 (40–48); d_2 72 (65–78); l_1 170 (150–183); 3 pairs of caudal setae 25–30; ic_2 70 (65–75); ic_3 70 (65–75); ic_3 – ic_3 40 (40–45); ic_4 45 (45–55); penis 160 (148–160).

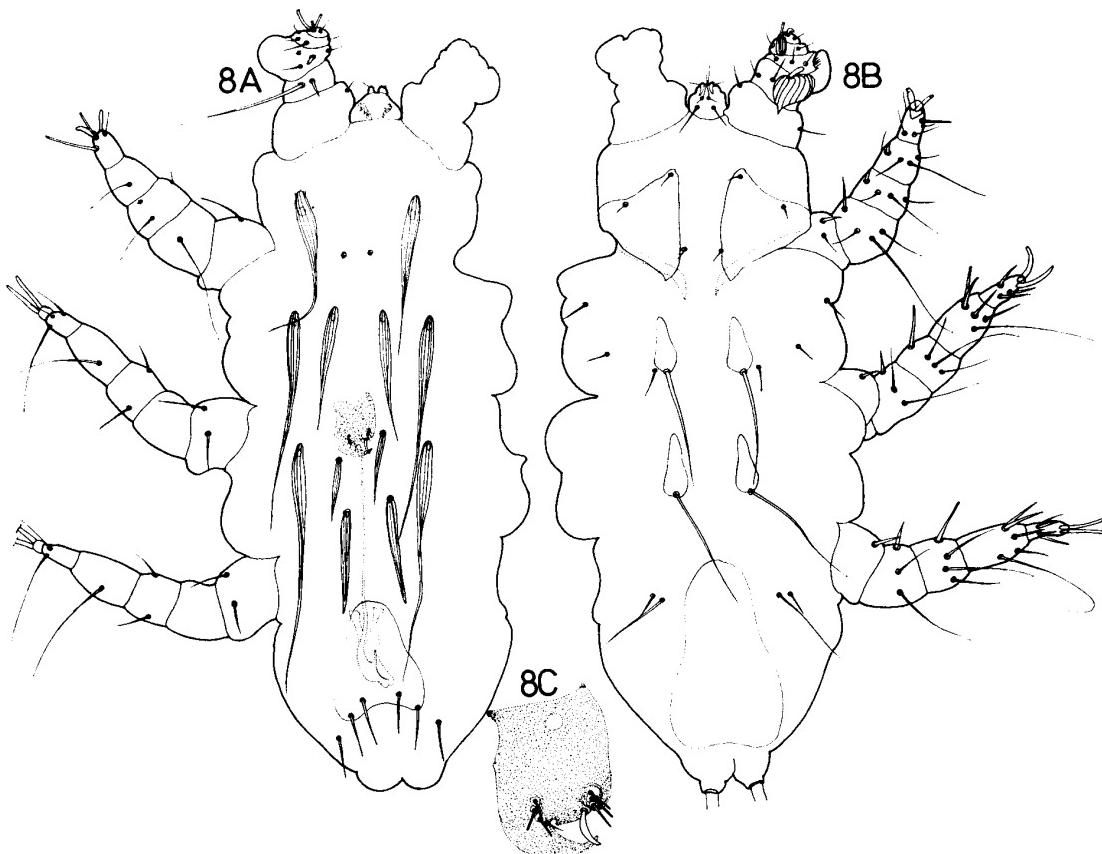


Fig. 8. *Acanthophthirius (Myotimyobia) mystacinoides* sp. nov., male. — A, dorsum; B, venter; C, genital shield.

Female (Fig. 9). Damaged 2 specimens were available. Idiosoma much longer than wide. Dorsal setae inflated and striated, but rather slender. Three pairs of ventral setae, ic_2 - ic_4 , long. Opisthogastric sclerites closer to ic_4 than to g_1 .

Measurements in microns (allotype only): Body 550 long by 200 wide; vi 65 long; ve 98; $sc\ i$ 88; $sc\ e$ 145; d_1 73; d_2 80; d_3 70; l_1 180; l_2 80; ic_2 70; ic_3 80; ic_4 50; ic_4 -opisthogastric sclerite 23; opisthogastric sclerite- g_1 72; sclerite-sclerite 58; ic_4 - ic_4 68.

Material examined. Holotype male, allotype female, 4 paratype males and a paratype female ex *Myotis mystacinus*, Memanbetsu, Hokkaido, Japan, 25 June 1967 (coll. Dr. MAEDA).

The holotype male and allotype female are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo (NSMT-Ac 9341), and the other types in the collection of the author.

Notes. The present new species is very close to *Acanthophthirius (Myotimyobia) mystacinalis* (RADFORD), which is redescribed in FAIN (1978). The dorsal setae of both the sexes are, however, slightly slenderer in the new species than in *A.(M.) mystacinalis*. And the male genital shield and the situation of the opisthogastric sclerites

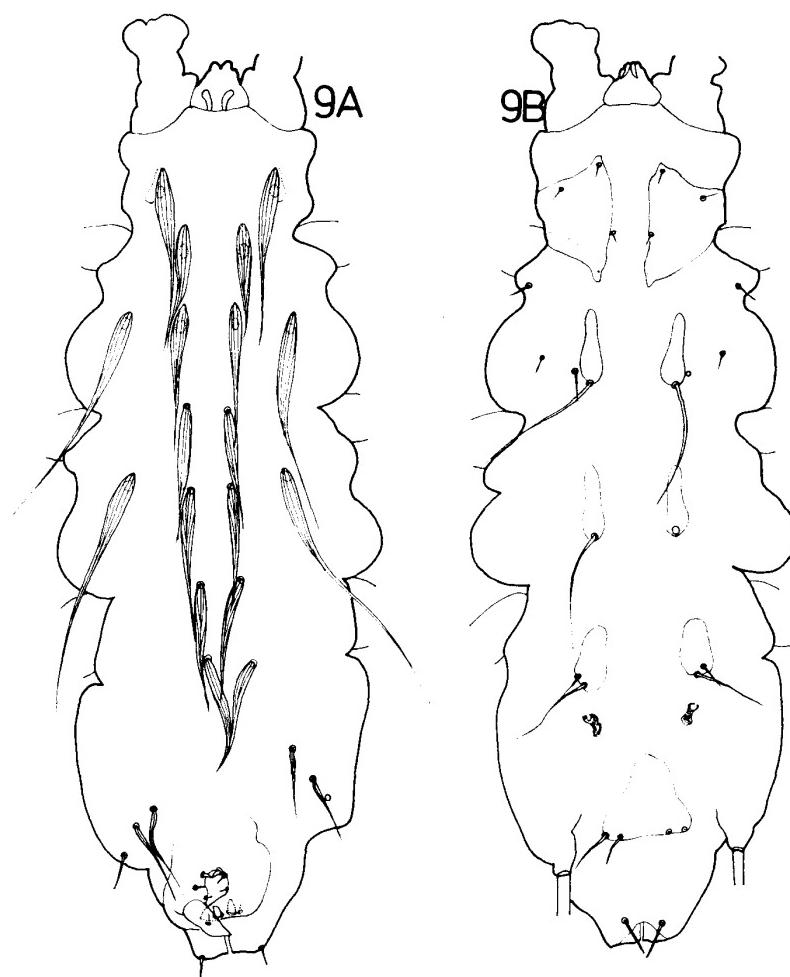


Fig. 9. *Acanthophthirius (Myotimyobia) mystacinoides* sp. nov., female. — A, dorsum; B, venter.

of the female are quite different in both the species.

As presented below, all the known species of *Myotis* bats distributed in Japan are associated with respective specific species of *Acanthophthirius (Myotimyobia)*. This suggests that *Acanthophthirius (Myotimyobia)* mites are rigidly host species specific on *Myotis* bats. When closely related but different species of the mites were recorded from bats of the same specific name, it would be necessary to re-examine systematic position of host bats. European *Myotis mystacinus* yielded *A.(M.) mystacinalis* (RADFORD) (FAIN & AELLEN, 1979), while the Japanese bat of the same name presented the new species. Thus, it is reasonable to presume that the bats from Europe and Japan belong to different taxa, though they have so far been named the same.

(To be continued.)